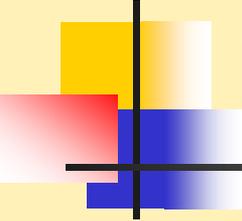


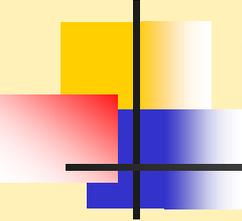
Chapter 35

Nursing Care of Patients with Disorders of the Urinary Tract



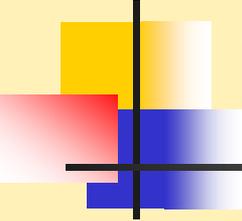
Urinary Tract Infections (UTI)

- Invasion of the urinary tract by bacteria
- Incidence in women is greater than in men
 - Shorter urethra
 - Location of meatus
- Elderly men are susceptible because of enlarged prostate
 - Obstruction to flow of urine



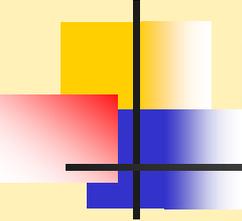
UTI Predisposing Factors

- Stasis of urine
 - Obstruction
 - Not voiding often enough
 - Overdistention of bladder decreasing blood supply
 - Stagnant urine good medium for bacterial growth



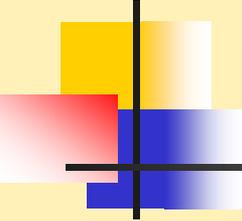
UTI Predisposing Factors

- Contamination in perineal/urethral area
 - Fecal incontinence
 - Improper wiping technique
 - Intercourse
 - Presence of infection (vaginitis, epididymitis, or prostatitis)



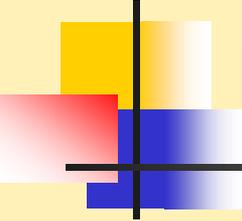
UTI Predisposing Factors

- Instrumentation
 - Catheter
 - Cystoscopy
- Reflux of urine
 - Congenital
 - Complication from previous infections



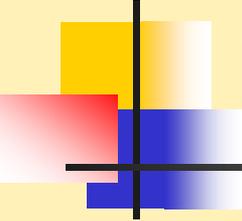
UTI Predisposing Factors

- Previous UTI's
 - More prone



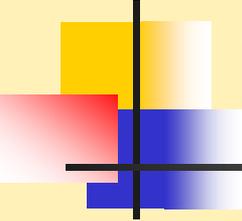
UTI

- Urethritis
 - Inflammation of urethra
- Cystitis
 - Inflammation/infection of bladder wall
- Pyelonephritis
 - Infection of the kidney



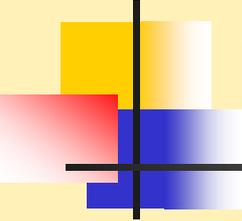
UTI

- Causes
 - Chemical irritant
 - Bacterial infection
 - Sexual activity



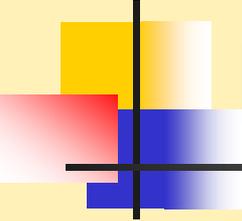
UTI

- Signs and symptoms
 - Dysuria
 - Urgency
 - Frequency
 - Cloudy, foul smelling urine



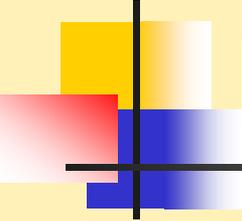
UTI

- Treatment
 - Eliminate irritant
 - Urine and C & S
 - Antibiotic therapy
 - Uncomplicated UTI—Bactrim or Septra
 - Complicated UTI—Cipro
 - Urinary analgesic
 - Pyridium—orange colored urine



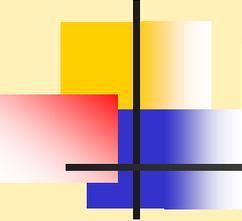
Nursing Assessment

- Pain on urination, flank pain, fever, chills, malaise
- Urine examined for cloudiness, blood, foul odor
- Predisposing factors
- Urinalysis and culture results



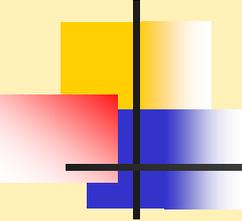
Prevention of UTI

- Patient education
 - Void frequently
 - Drink plenty of fluids
 - 10 oz. cranberry juice/day
 - Take shower rather than tub bath
 - Wipe perineum front to back



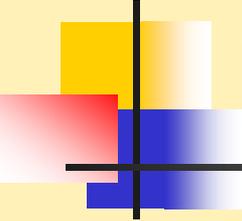
Prevention of UTI

- Patient education (cont.)
 - Urinate after intercourse
 - Avoid bubble baths and bath salts, perfumed feminine hygiene products, synthetic underwear, and constricting clothing (tight jeans)
 - Finish medications, do not stop when symptoms stop



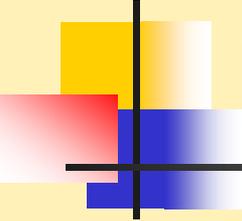
Urological Obstructions

- Obstruction of urine flow is always significant
- Backup of urine destroys kidney
- Urethral strictures
 - Urethra lumen narrowing resulting from scar tissue, enlarged prostate, tumor, or calculi
- Renal calculi
 - Hard, generally small stones
 - Kidney stones: nephrolithiasis



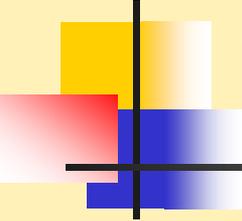
Renal Calculi

- Common urinary salts
 - Calcium oxalate
 - Calcium phosphate
 - Magnesium ammonia
 - Uric acid
 - Cystine



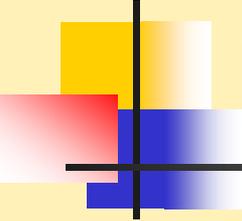
Renal Calculi

- Causes
 - Hereditary factor
 - Chronic dehydration
 - Infection
 - Dietary intake
 - Immobility



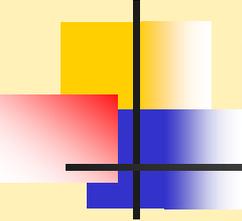
Renal Calculi

- Signs and symptoms
 - Extreme flank pain
 - Renal colic
 - Hematuria
 - Dysuria
 - Frequency
 - Urgency
 - Nausea and vomiting



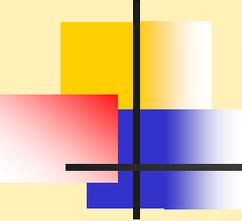
Renal Calculi

- Diagnostic tests and procedures
 - Urinalysis
 - KUB
 - Intravenous pyelogram



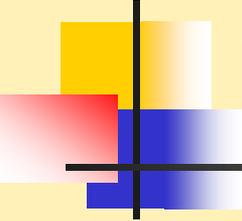
Renal Calculi

- Treatment
 - Medical management
 - Increase fluids
 - Analgesics
 - Strain all urine



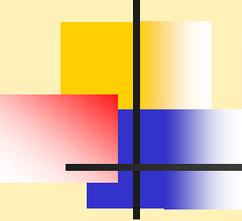
Renal Calculi

- Treatment
 - Lithotripsy
 - Stone shattered or crushed into small pieces
- Types of Lithotripsy
 - Extracorporeal shockwave lithotripsy
 - Laser lithotripsy
 - Electrohydraulic lithotripsy



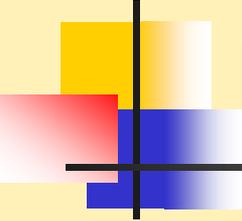
Renal Calculi

- Extracorporeal shockwave lithotripsy (ESWL)
 - Extracorporeal means it occurs outside the body—non-invasive procedure
 - Most common
 - NPO prior to procedure
 - May stop aspirin, ibuprofen, plavix, coumadin or any drugs interfering with blood coagulation, several days prior to procedure



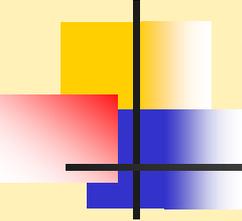
Renal Calculi

- ESWL (cont.)
 - Mild sedative
 - Stone located with x-ray or ultrasound
 - High-energy shock waves break up stone into tiny pieces
 - Procedure time: 45 minutes to one hour



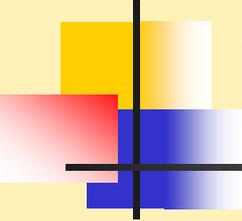
Renal Calculi

- ESWL (cont.)
 - Monitored for 2 hours post procedure
 - Resume daily activities in one to two days post procedure
 - Increase fluid intake after procedure
 - Analgesics
 - Small amount of hematuria is expected for a few days
 - Strain urine, save stone when passed



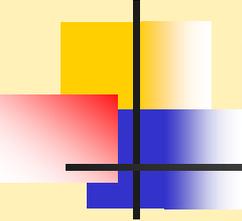
Renal Calculi

- Laser lithotripsy
 - Minimally invasive
 - Flexible laser inserted through cystoscope for stones in bladder, ureter, or kidney
 - Laser vaporizes the stone
 - Slowly replacing ESWL as the standard of care



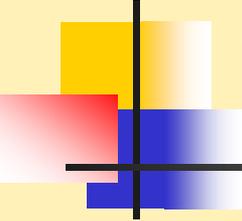
Renal Calculi

- Advantages of laser lithotripsy over ESWL
 - Better treatment for more complex stones
 - Higher success rate with a single treatment
 - No risk of generating potential seeds for future stone formation



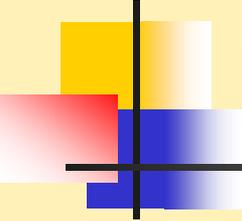
Renal Calculi

- Laser lithotripsy
 - Prior to procedure patient prepared same as ESWL with some additional blood work and possible EKG
 - General anesthesia
 - Usually same day procedure
 - Monitor patient same as post ESWL



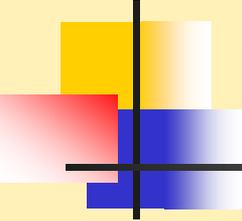
Renal Calculi

- Electrohydraulic lithotripsy
 - Minimally invasive
 - Electric current used to fragment stone
 - Not lithotripsy of choice
 - Can cause injury to surrounding tissues and structures



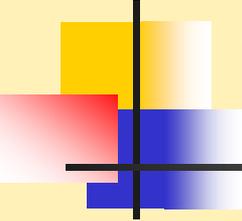
Renal Calculi

- Treatment
 - Surgery—type of surgery depends on location of the stone
 - Endoscopically
 - Incision
 - Requires hospital stay
 - Increased risk of complications



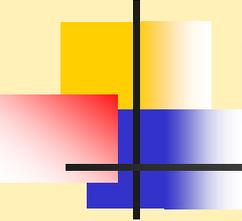
Renal Calculi

- Prevention
 - Determine what stone is composed of
 - Drink plenty of fluids—mainly water
 - Decrease intake of high oxalate foods
 - Chocolate, nuts, tea, and spinach
 - Increased intake of animal protein (beef, chicken, pork, fish, and eggs) increase risk of renal calculi



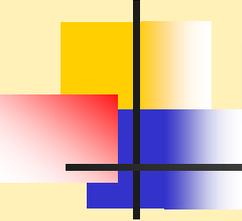
Renal Calculi

- Nursing Assessment
 - Pain level
 - Strain all urine
 - Accurate I & O (alert oliguria/anuria)
 - Monitor urine: hematuria and pyuria
 - Monitor temperature and lab results for signs of infection



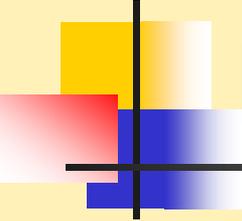
Hydronephrosis

- Result of an untreated urinary tract obstruction
- Treatable once diagnosed
- Due to obstruction urine backs up, distends ureter and progresses to kidney
- Unilateral or bilateral
- Kidneys turn into overfilled bags of urine normal function is lost



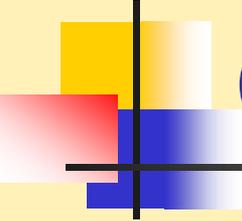
Hydronephrosis

- Gradual onset
- Treatment
 - Relieve obstruction
 - Possible nephrostomy tube



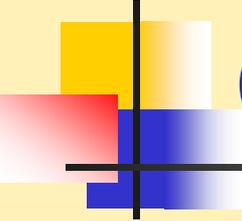
Hydronephrosis

- Nursing Care
 - Careful I&O
 - NEVER clamp nephrostomy tube
- Complications
 - UTI's
 - Renal failure



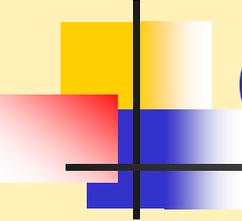
Cancer of the Bladder

- Most common urinary tract cancer
- Causes: Smoking, industrial pollution
- Signs and symptoms: Painless hematuria



Cancer of the Bladder

- Diagnosis
 - Cystoscopy
 - IVP or retrograde pyelogram
- 70% of bladder cancers are superficial
 - Often recur following treatment
 - Most never progress to a more invasive stage
 - High survival rate

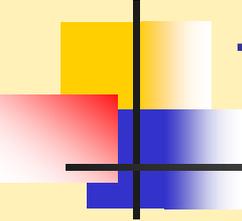


Cancer of the Bladder

- Further diagnostic testing may be done to determine metastasis (usually if there is muscle involvement)

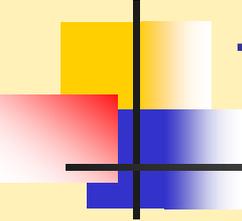
CAT scan

Bone scan



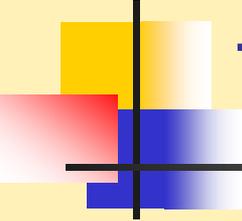
Treatment

- Superficial bladder cancer
 - Transurethral resection of bladder via cystoscope
 - Follow up: cystoscopy q 3-6 mths. for 2 yrs.
 - Then q 6 mths. until they go 5 yrs. Without recurrence
 - Smokers may lower their risk for recurrence if they stop smoking



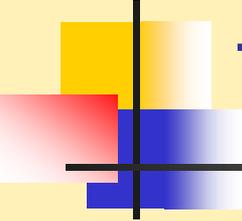
Treatment

- If multiple tumors or incomplete resection of tumors
 - Following TUR of bladder chemotherapeutic medications instilled into bladder
 - BCG treatment
 - Weakened strain of organism that causes tuberculosis
 - Causes immune response that kills cancer cells
 - Once a week for six weeks
 - Side effects: hematuria, burning, frequency, fatigue



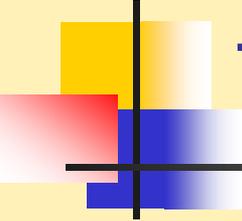
Treatment

- Muscular involvement
 - Rarely curable with TUR of bladder alone
 - Partial cystectomy followed by radiation
 - TUR bladder followed with chemo and radiation
 - Both of these are done to try and spare the bladder



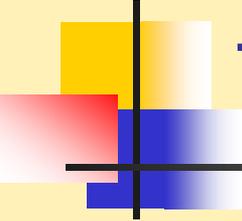
Treatment

- Muscular invasive disease and no documented metastasis
 - Radical cystectomy
 - Men: prostate and seminal vesicles
 - Women: uterus, ovaries, urethra, and part of vaginal wall
- Urinary diversion
 - Urine leaves the body in a different manner



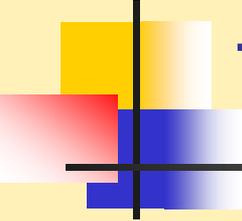
Treatment

- Incontinent urinary diversion
 - Ileal conduit
 - Stoma on abdomen
 - Almost continuously drains urine
 - Normal for urine to contain mucus
 - Ostomy appliance



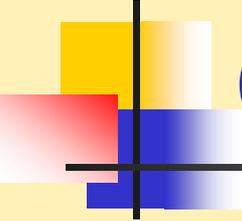
Treatment

- Continent urinary diversion
 - Kock pouch
 - Section of ileum create reservoir for urine
 - Special nipple valve
 - Stoma on abdomen



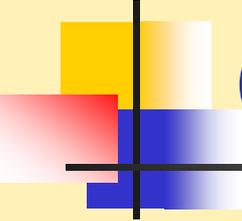
Treatment

- Orthotopic bladder substitution
 - Section of bowel
 - Implant ureters and urethra
 - Void through urethra
 - Incontinence may be a problem
 - Intermittent catheterization may be necessary



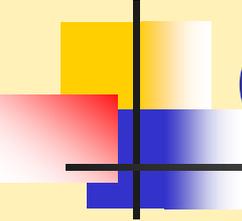
Cancer of the Bladder

- Nursing management
 - Monitor urine output
 - Education



Cancer of the Kidney

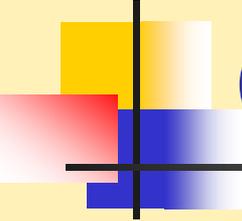
- Survival rate 79-100% with early detection
- 90% of all kidney tumors malignant
- More common in males 50-70 yrs. of age



Cancer of the Kidney

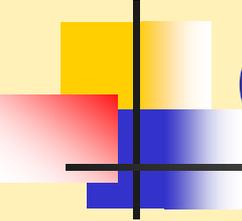
- Black men slightly higher risk

Risk Factors: smoking, family hx of kidney cancer, polycystic kidney disease, chronic kidney failure, obesity, hypertension, and radiation.



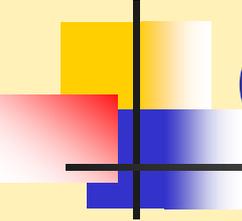
Cancer of the Kidney

- Signs and symptoms
 - Seldom causes problems in early stage
 - Hematuria, dull pain in flank area, mass, unintentional weight loss
 - Accidental discovery
 - With metastasis s/s will depend on area or organ involved.



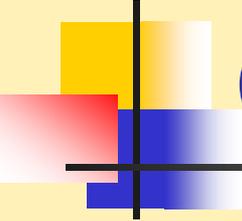
Cancer of Kidney

- Diagnosis
 - IVP
 - Ultrasound of kidney
 - Biopsy
 - CT scan
 - MRI



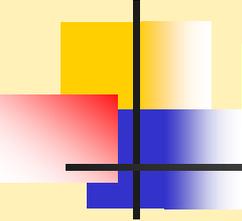
Cancer of Kidney

- Treatment
 - Radical nephrectomy
 - Removal of adrenal gland, fat, lymph nodes
 - Chemotherapy and radiation therapy



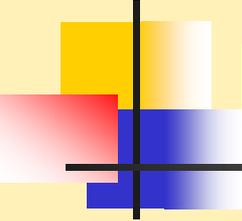
Cancer of the Kidney

- Signs and symptoms: Hematuria, dull pain in flank area, mass
- Radical nephrectomy
- Nursing management
 - Monitor urine output
 - Education



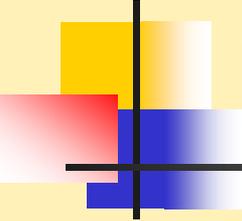
Polycystic Kidney Disease

- Hereditary disorder
- Result in renal failure
- Formation of multiple cysts in kidney
- Cysts: grapelike can contain serous fluid, blood or urine.
- Eventually replace normal kidney structures



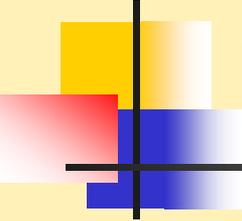
Polycystic Kidney Disease

- S/S: dull heaviness in flank or lumbar area, hematuria. As disease progresses, s/s of renal failure
- NO TREATMENT to stop progression
- Symptomatic treatment: for relief of UTI, hypertension, renal failure



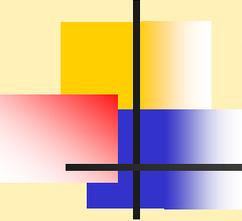
Diabetic Nephropathy

- Long-term complication of diabetes mellitus
- Most common cause of renal failure
- Atherosclerotic changes decrease blood to kidney
- Need smaller doses of insulin as progresses
- Chronic renal failure develops



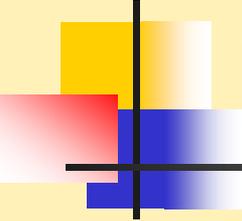
Diabetic Nephropathy

- Long-term complication of diabetes mellitus
 - Diabetes affects circulation to kidneys
 - Complication of Type I or Type II
 - Prevention: keep glucose levels under good control
- Most common cause of renal failure



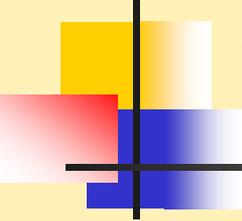
Diabetic Nephropathy

- Atherosclerotic changes decrease blood to kidney
 - Decreased blood supply results in damage to glomerulus
 - Protein penetrates membrane into urine rather than back to blood stream
 - Initially microalbuminuria
 - Usually span of 10-15 yrs.
 - Amount of protein in urine gradually increases



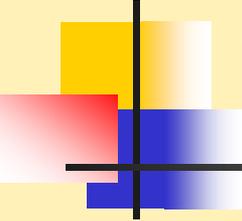
Diabetic Nephropathy

- Other reasons for kidney damage due to diabetes
 - Pyelonephritis: repeated attacks lead to renal scarring—kidney damage
 - Neurogenic bladder: results in incomplete bladder emptying resulting in increase in UTI's, increase risk for calculi, possible obstruction



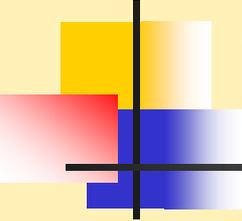
Diabetic Nephropathy

- Need smaller doses of insulin as disease progresses
 - Kidney normally breaks down insulin
 - Improperly functioning kidneys, not broke down as quickly
 - Small doses of insulin circulate in body longer



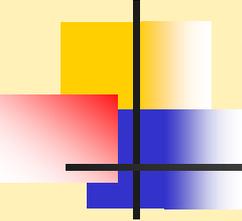
Diabetic Nephropathy

- Chronic renal failure develops
 - As disease progresses, high output renal failure (nonoliguria) can develop
 - Large amounts of urine excreted, appears kidneys are functioning well, urine is not getting rid of most of the waste products
 - Toxic buildup in blood
 - At this stage nephrotic syndrome can develop
 - Large amts. of protein in urine, low amts. of albumin in blood stream: result: massive edema



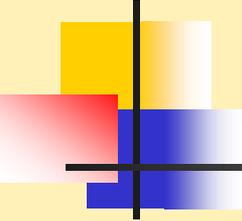
Diabetic Nephropathy

- Signs and symptoms
 - Initially show small amts. protein in urine
 - Increase protein in urine
 - High output renal failure
 - Then decreased urine output
 - Toxic waste buildup in blood
 - s/s chronic renal failure
 - Figure 35-6 pg. #598 Williams and Hopper



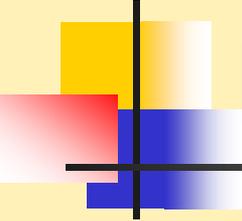
Diabetic Nephropathy

- Treatment
 - Medical management
 - Good control of glucose levels to slow progression of disease
 - Hypertension medications
 - Weight loss if overweight
 - Dialysis when disease progresses to renal failure: dialysis or transplant



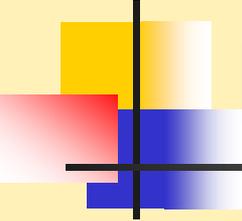
Nephrotic Syndrome

- Large amts. of protein lost in urine from increased glomerular membrane permeability
 - Diabetes
 - Glomerulonephritis
 - Primary nephrotic syndrome
 - Systemic lupus erythematosus
 - Infections
 - Cancer
 - Medications: nonsteroidal anti-inflammatory drugs
 - Table 35-1 pg.#598 Williams and Hopper



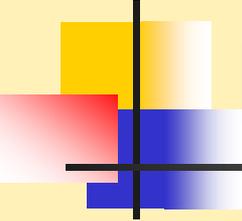
Nephrotic Syndrome

- High levels of protein in urine
- Low levels of protein in blood
- Edema
- Increased cholesterol



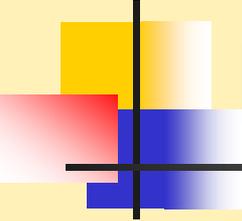
Nephrotic Syndrome

- Manage underlying cause and symptomatic treatment
 - Edema: diuretics, decrease Na intake
 - Decrease protein intake
 - Lipid lowering medications
 - Anticoagulants



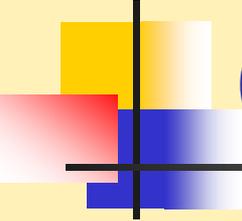
Nephrosclerosis

- Hypertension damages kidneys by sclerotic changes
 - Thickening and hardening of renal arteries
 - Results in ischemia to kidneys
- Signs and symptoms
 - Initially protein in urine, hyaline casts
 - With progression s/s of renal failure



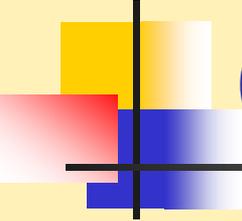
Nephrosclerosis

- Treatment
 - Treat the cause
 - Anti-hypertensive medications
 - Low sodium diet
 - Renal failure—dialysis



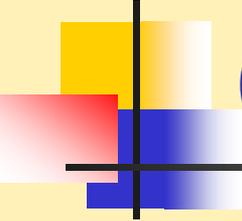
Glomerulonephritis

- Inflammatory disease of the glomeruli
- Causes glomerulus to be more porous
- Allows proteins, WBCs, RBCs to leak into urine



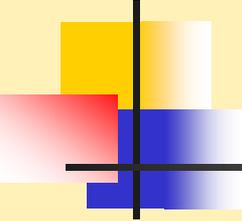
Glomerulonephritis

- Causes
 - Acute poststreptococcal
 - Goodpasture's syndrome
 - Chronic glomerulonephritis
- Symptoms
 - Oliguria, hypertension, electrolyte imbalances, edema, flank pain



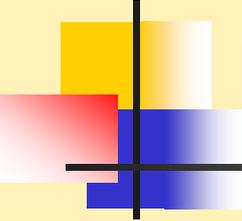
Glomerulonephritis

- Medical management resolves
- Renal failure treatment



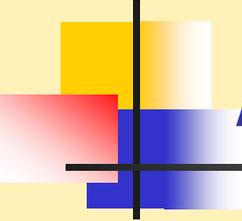
Renal Failure

- Occurs when the kidney's no longer perform properly in excreting wastes from the body



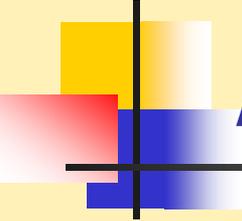
Renal Failure

- Impaired renal function can affect every system in our bodies
 - Fluid imbalances
 - Electrolyte imbalances
 - Decreased calcium levels, increased phosphorus levels
 - Decreased red blood cell production



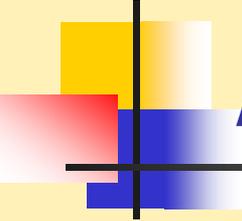
Acute Renal Failure

- Sudden loss of kidney function
 - Can occur within hours or days
- Waste products accumulate in the blood
 - Due to rapid damage to kidneys
- Oliguria develops (less than 20 cc/hr)



Acute Renal Failure

- May recover
 - Depending on the cause
 - Supported through with temporary dialysis and prevention of complications (infection, pneumonia, or septicemia)

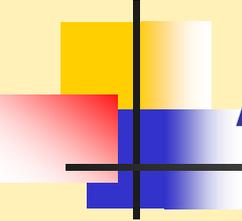


Acute Renal Failure

- Causes

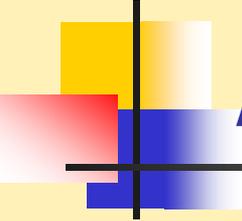
- Prerenal failure—problem prior to the kidneys

- Decreased blood supply to kidneys
- Decreased blood pressure from dehydration, blood loss, shock, or trauma



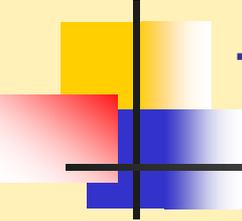
Acute Renal Failure

- Intrarenal failure—problem inside the kidney
 - Damage to nephrons
 - Infection leading to glomerulonephritis, blunt trauma to kidney, exposure to nephrotoxins, allergic reactions, rhabdomyolysis,



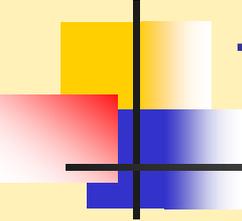
Acute Renal Failure

- Causes
 - Postrenal Failure—problem after the kidney
 - Obstruction



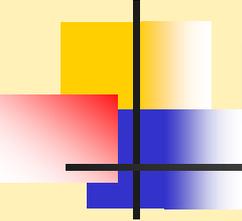
Treatment for Acute Renal Failure

- Treat underlying cause
- Temporary dialysis to treat uremia
- Continuous renal replacement therapy
 - Intensive care unit
 - Dialyse patient slowly and continuously over a 24 hour period
 - Bed bound, acutely ill, and intolerant rapid fluid shifts



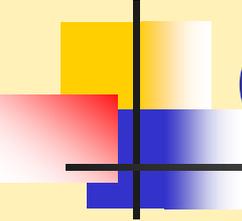
Treatment

- Continuous renal replacement therapy
 - Removes fluid continuously along with hemodialysis
 - Alone to remove fluid/solutes in controlled, continuous manner in unstable patients
 - Blood flows through hemofilter, excess fluids/solutes move into collection bag, blood returns to patient



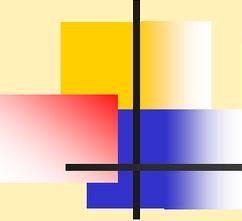
Nursing Care

- Careful monitoring of I&O, fluids, electrolytes, daily weights, hourly vital signs, and vascular access is vital



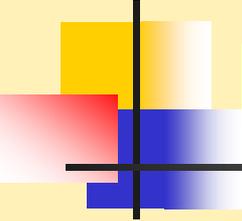
Chronic Renal Failure

- Gradual decrease in kidney function
- Irreversible—once nephrons are damaged they are lost forever
- Etiology
 - Diabetic nephropathy
 - Nephrosclerosis
 - Glomerulonephritis
 - Autoimmune diseases



Pathophysiology

- Large proportion of nephrons damaged
- Progressive
 - Early stage 50% of nephrons lost—no symptoms
 - Renal insufficiency—75% nephrons lost
 - Mild s/s of renal failure develop
 - Anemia
 - Increased BUN and creatinine
 - 24 hour creatinine clearance test to determine how much kidney function

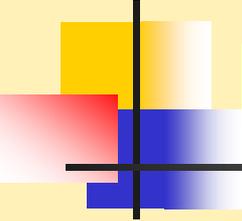


Pathophysiology

- Primary goal—prevent any further damage

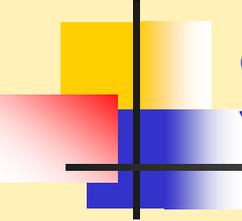
End stage (ESRD)—90% nephrons lost

- Extremely increased BUN and creatinine levels
- Systemic symptoms
- Urine production does not necessarily cease—urine is produced but is not excreting waste products
- Dialysis or transplant necessary for survival



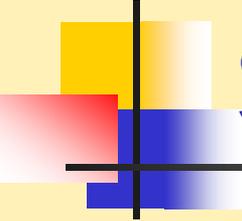
Pathophysiology

- Uremia—urea in the blood
- Affects all body systems—Figure 35-6 p. 598



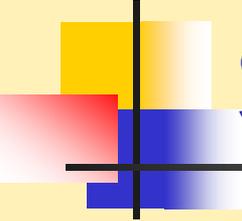
Symptoms of Renal Failure

- Fluid accumulation
 - Edema, SOB, crackles, wheezing , distended neck vessels, increased blood pressure
 - Varying urine production—polyuria, oliguria or anuria
- Electrolyte imbalances
 - Hyponatremia—fld. retention, edema, elevated BP
 - Hyponatremia---confusion
 - Hyperkalemia—muscle weakness or cramping, abdominal cramping, diarrhea, confusion, cardiac dysrhythmias
 - Decreased calcium and increased phosphorus levels—prone to fxs, severe pruritis, muscle cramping or aching



Symptoms of Renal Failure

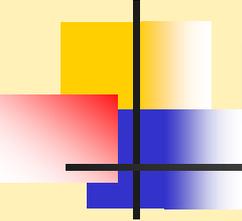
- Waste products retained
 - Azotemia—waste products of protein metabolism are not excreted and build up in blood
 - Increased BUN and creatinine, weakness, fatigue, confusion, seizures, twitching of extremities, n/v, lack of appetite, metallic taste in mouth, may smell odor of urine on breath, pale gray or yellowish bronze discoloration of skin, and pruritis
- Acid-base imbalances
 - Resulting in metabolic acidosis—headache, fatigue, weakness, n/v, and lack of appetite with progression lethargy, stupor, and coma



Symptoms of Renal Failure

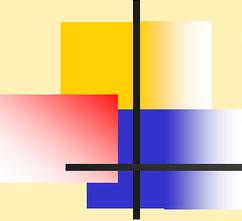
- Anemia

- Decreased production of hormone erythropoietin
- Nutritional deficiencies
- Blood loss
- Also decreased immune function—decreased WBC's, decreased platelet function (risk for bleeding)



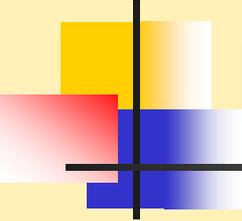
Nursing Interventions

- Fluid accumulation
 - Daily weights
 - I&O
 - Fluid restriction will be ordered specifically, usually 1000cc/24 hr
 - Lung sounds
 - Document edema



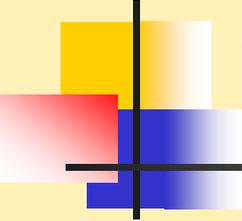
Nursing Interventions

- Electrolyte imbalances
 - Monitor lab values
 - Restricting K⁺ intake
 - Educate patient on high K⁺ foods Box 35-6 p. 603
 - Kayexalate orally or retention enema
 - Encourage ambulation
 - Anti-pruritic medication
 - Tums or Caltrate



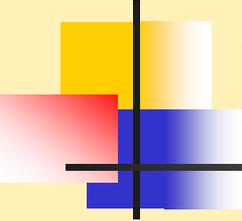
Nursing Interventions

- Waste products retained
 - Monitor lab values
 - Dietary education
 - Assistance with ADL's
 - Good oral hygiene and skin care
 - Seizure precautions



Nursing Interventions

- Acid-base imbalance
 - Monitor respiratory rate
 - Monitor LOC
 - Monitor lab values

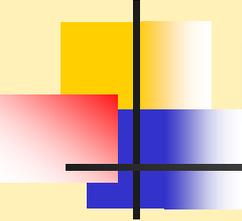


Nursing Interventions

- Anemia

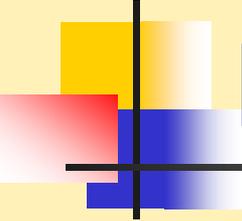
- Procrit

- Monitor blood pressure, notify MD of severe hypertension or noted increase
 - Additional antihypertensives may be needed during initiation of therapy
 - Possibility of seizures: seizure precautions should be instituted in patient who experience > than 4 point increase in hct in a 2 week period or exhibit any change in neurologic status. Risk greatest in the first 90 days of therapy



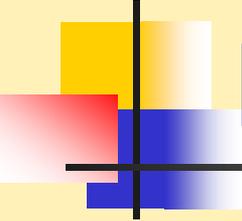
Nursing Interventions

- Procrit
 - Do not shake bottle vial—may inactivate medication
- Assist with activities of daily living



Medical Management

- Diet
- Medications
- Dialysis
 - Hemodialysis
 - Peritoneal dialysis
- Kidney Transplant



Medical Management

- Diet

- High calorie

- Maintain weight and energy needs

- Low protein

- Unless on dialysis, then need increased to compensate for the protein lost during dialysis

- Low potassium

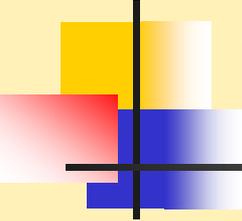
- High K⁺ foods: citrus fruits and juices, bananas, salt substitute, potatoes (white and sweet), dairy products, meats, and chocolate
 - Also nuts, beans, seeds, and vegetables.



Diet

Important guidelines for decreasing K⁺ intake

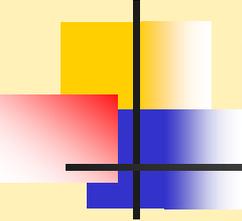
- Cook frozen fruits and vegs. in water and rinse and drain well before serving
- Drain liquid from all canned fruits and vegs. and rinse before serving
- Peel potatoes, slice thin, soak in water 4 hr or overnight
- Check for hidden potassium by checking ingredient labels for potassium chloride
- Avoid salt substitutes
- Must limit foods high in potassium



Diet

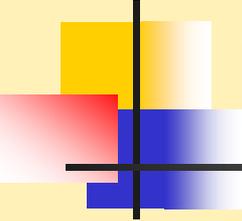
- Low sodium

- Limit canned and processed foods—contain high amounts of sodium
- Read labels—choose foods with sodium content of 140mg or less per serving
- Do not choose foods with sodium content of 400 mg of sodium per serving
- Season instead of using salt—basil, curry, dill, garlic, ginger, lemon, mint, oregano, and thyme



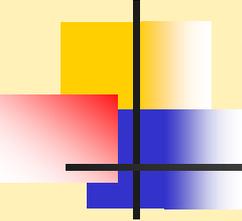
Diet

- Increased calcium and decrease phosphorus
 - Calcium is increased or supplemented
 - Can have these foods to balance calcium and phosphorus but in limited amounts: milk, chocolate, cheese, beer, yogurt, firm tofu, and ice cream
 - Do not eat these foods, high in phosphorus: cola drinks, dried or baked beans, nuts and seeds of all kinds, and peanut butter



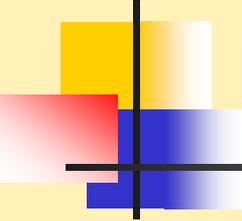
Diet

- Vitamins, iron, and minerals
 - Supplemented
 - Take iron between meals if using phosphate binders at mealtime—the iron can get caught by the binder and be eliminated from the body
 - Eat high fiber foods to prevent constipation—fresh fruits and vegetables low in potassium
 - Stool softener



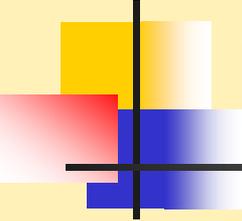
Diet

- Fluid restriction
 - Usual 1000cc/24 hr
 - May change daily—depending on amount of urine output the previous day—500 cc plus amount of urine output yesterday= total fluid restriction
 - Helpful hints
 - Drink from small cup or glass
 - Divide your fluids for the day: meals, b/w meals, and snacks



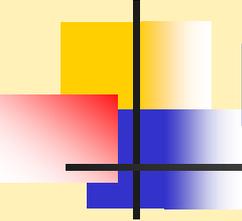
Diet

- Helpful hints with fluid restriction
 - Take medications at mealtime
 - Limit amount of liquid foods
 - Rinse mouth with water rather than drink it
 - Chew sugar-free gum or suck on hard candy
 - Suck on lemon wedge to moisten mouth
 - Freeze grapes, berries, or small pieces of fruit and let them thaw slowly in your mouth—remember needs to be counted in with total fluid volume



Diet

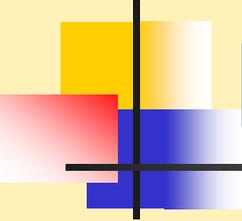
- What counts as fluid
 - Ice cubes, ice chips
 - Water, coffee, tea, sodas, milk, juices cream, liquid creamers
 - Soups
 - Popsicles
 - Ice cream sherbets
 - Gelatin



Medical Management

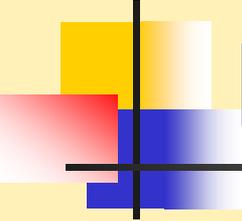
- Medications

- Diuretics– early in disease to increase output
- Antihypertensives—control BP and decrease damage
- Phosphate binders—Tums with meals
 - Bind to the phosphorus in the food you eat, keeps the phosphorus from being absorbed into your body, passes out of body with stool.
 - Phosphate binders can cause constipation



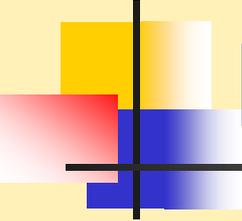
Medical Management

- Calcium/vitamin D supplements
 - Prevent fractures
- Kayexalate
 - Orally or retention enema
 - Potassium will be eliminated through bowels
 - Lower potassium levels
 - Hemodialysis best treatment for increased K⁺ levels



Medical Management

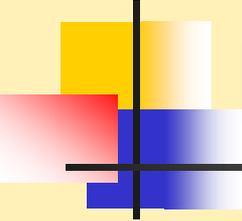
- Dialysis is started when symptoms of severe fluid overload, high potassium levels, acidosis, or symptoms of uremia are life threatening
- Dialysis
 - Hemodialysis—filters blood through a machine. Blood travels from body to machine, cleansed, and returned
 - Peritoneal dialysis—uses the natural lining of your abdomen. Fluid instilled into abdomen, cleansed, and fluid removed



Medical Management

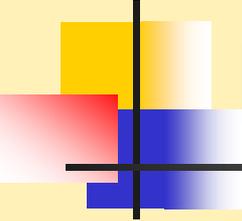
- Hemodialysis

- Artificial kidney—dialyzer
- Usually 3-4 hours/3 or 4 times a week
- Regular schedule set up
- Hemodialysis center or hospital
- Removes waste products from the blood, fluid and chemicals balanced



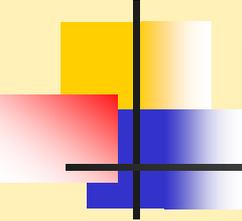
Hemodialysis

- A trained nurse or technician connects patient to dialysis machine, watches for problems, and makes patient as comfortable as possible
- Problems to watch for: chest pain, bleeding from the needle site, SOB, fever or chills, headache or lightheadiness, nausea or vomiting, itching, and muscle cramps
- Sudden drops in BP can occur



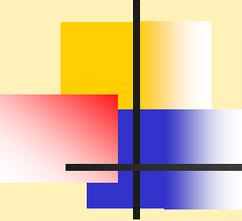
Hemodialysis

- During the dialysis, only about 250 ml of blood is out the patient's body at any one time
- Initially patient may experience headache, muscle cramps, or feel nauseated. These should decrease as their body gets used to the dialysis.
- Patients are given large doses of Heparin to prevent the blood from clotting while in the dialyzer. Monitor for bleeding.



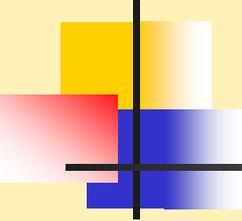
Hemodialysis

- Following a dialysis treatment, the patient normally feels weak and fatigued, sometimes even too tired to eat.



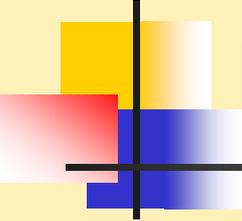
Hemodialysis

- Before hemodialysis can be done, an access, is necessary. To maximize amount of blood cleansed during dialysis. Provides high volumes of blood flow continuously during treatment
- Ideally an access site should be prepared weeks or months before dialysis is started.
- Three basic types:
 - Venous catheter
 - Arteriovenous (AV) fistula
 - AV graft



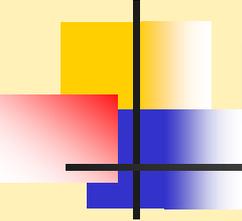
Hemodialysis

- Venous catheter
 - Temporary access
 - Catheter inserted into large vein in neck, chest, or groin
 - Two ports to allow two-way flow of blood
 - Extremely important to ensure clamps in place
 - Not recommended for permanent access: can block easily, become infected, or cause narrowing of the veins in which they are placed
 - Used for initial hemodialysis and several weeks or months until permanent access is developed



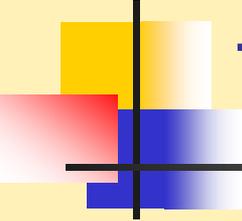
Hemodialysis

- Arteriovenous (AV) fistula
 - Best type of long term vascular access: provides adequate blood flow for dialysis, lasts a long time, and has lower complication rate
 - Surgical procedure—local anesthetic—connecting an artery to a vein to allow more blood to flow into the vein
The vein grows larger and stronger—making repeated insertions for hemodialysis treatments easier
 - Takes time to develop—months—rare up to 24 months
 - Less likely to clot or become infected



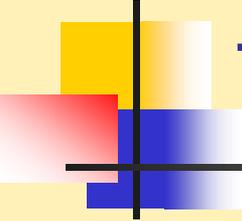
Hemodialysis

- Arteriovenous (AV) graft
 - Graft does not need to develop like AV fistula—can be used soon after placement—often within 2 to 3 weeks
 - If patient has small veins that won't develop properly into a fistula—a synthetic tube is implanted under the skin—connecting vein to artery--the tube becomes an artificial vein for repeated needle access for dialysis
 - Compared to fistulas, grafts have increased tendency to clot or develop infection and need to be replaced sooner
 - Some well cared for grafts can last for several years



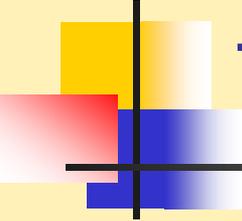
Taking Care of Access Site

- Check access q8h in hospital, at home daily, at each dialysis treatment
- Keep site clean at all times
- USE ACCESS SITE ONLY FOR DIALYSIS
- Careful not to bump or cut site
- No blood pressure on that arm or draw blood
- Don't wear jewelry or tight clothes over site



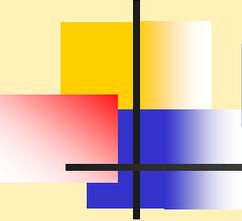
Taking Care of Access Site

- Do not sleep with access arm under your head or body
- Do not lift heavy objects or put pressure on access arm
- Check pulse every day
- Check for thrill or bruit
- Wash hands often



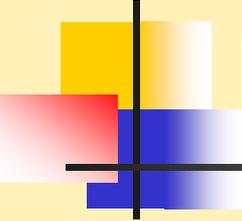
Taking Care of Access Site

- Problems to watch for
 - Can't feel a thrill
 - Pain or numbness in arm or hand
 - Bleeding, redness, or warmth around access site
 - Sudden bulging out—normal to have slight bulge
 - Fever 101 or greater



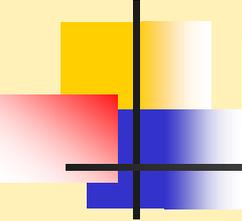
Medical Management

- Peritoneal dialysis
 - Peritoneal membrane used as filter for blood
 - Dialysate solution used in process
 - Three steps: filling, dwelling, and draining
 - Access: peritoneal catheter placed into abdomen through stab wound just below umbilicus
 - End is capped when not in use
 - Dietary restrictions not as strict



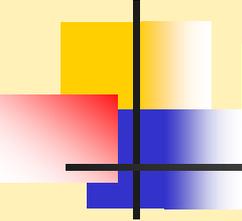
Peritoneal dialysis

- Peritoneal dialysis is done at home
- 4 to 5 exchanges are needed daily, taking about 30 minutes each
- CAPD (continuous ambulatory peritoneal dialysis)
- CCPD (continuous cyclic peritoneal dialysis)
 - A machine does most of the exchanges at night while you sleep



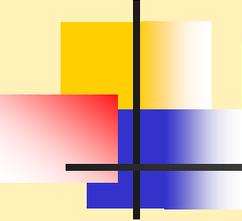
Peritoneal dialysis

- Steps involved in PD
 - Instill bag of sterile dialysate into peritoneal cavity through the catheter
 - Usually 1500 to 2000 ccs
 - Left in peritoneal cavity for several hours—allowing waste products from blood to pass through the peritoneal membrane into the dialysate solution
 - Solution then drained into bag and discarded
 - Type of PD will be determined by patient and physician to best fit that individual



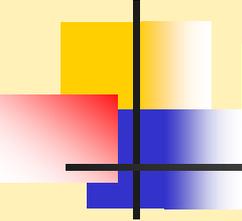
Peritoneal Dialysis

- Patient and family education is vital for success
- Sterile technique is imperative
- Wash hands prior to handling catheter
- Exchanges need to be done in clean environment
- Major complication: peritonitis—related to poor technique—first sign: abdominal pain



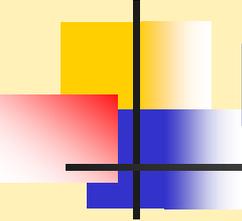
Peritoneal Dialysis

- Call doctor if:
 - Fever or chills
 - Pain in abdomen or around your catheter
 - Warm, red, or draining skin around catheter
 - Blocked flow into or out of your catheter
 - Dialysate that's cloudy or bloody when it drains from your body



Peritoneal Catheter

- Always wash hands prior to touching catheter
- Keep catheter clean and covered
- Anchor catheter
- Do not let clothes rub or pull at it
- Do exchanges in clean place
- Never use a cloudy or leaking bag of dialysate
- Do not swim in lakes or streams



Medical Management

- Kidney transplant
 - Living donor
 - Cadaver donor
 - Waiting list of months to years, depending on patient's blood type
 - Medications to prevent rejection
 - Psychological